

(3 Hours)

[Total Marks: 80]

N.B: 1. Question No 1 is Compulsory**2. Answer any 3 questions from the remaining questions**

- Q1 Answer **any four** questions
- a. With examples, describe basic discrete signals. **05**
 - b. What are stops and fricatives? How are they produced? **05**
 - c. How do we use audio processing for musical applications? **05**
 - d. What are the different properties of STFT? **05**
 - e. What is the need for auditory modelling? Discuss any two models with neat diagrams **05**
 - f. Compare Hamming window with rectangular window. **05**
- Q2
- a. Derive Goertzel algorithm. What is the use of Goertzel algorithm? **10**
 - b. With neat block diagram, analyze human speech production mechanism **10**
- Q3
- a. Derive the transfer function for uniform lossless tube model. Plot the response. **10**
 - b. What are adaptive quantizers? Differentiate feed forward adaptation from feed backward adaptation. Support your answer with neat diagrams. **10**
- Q4
- a. Justify the need for direct digital code conversion. Discuss the steps involved in converting LDM to PCM. **10**
 - b. How do you discriminate speech from silence? **10**
- Q5
- a. Define short time energy and zero crossing rate. How the voiced /unvoiced decision is taken using these parameters? **10**
 - b. Justify the need for short time analysis in speech processing. Discuss the steps involved in short time autocorrelation calculation. What is the use of short time autocorrelation? **10**
- Q6
- a. With necessary equations, implement linear filter interpretation. **05**
 - b. What do you mean by Filter bank summation method for short time synthesis of speech signals? **10**
 - c. Explain the working of voice excited LPC. **05**
